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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/685,103	10/14/2003	Julian Norley	P1083/N9631	4471

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EXAMINER	
CHAN, SING P	
ART UNIT	**PAPER NUMBER**
1734	

DATE MAILED: 04/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	**Application No.** 10/685,103	**Applicant(s)** NORLEY ET AL.
	Examiner Sing P. Chan	**Art Unit** 1734

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.
2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9,12-31 and 34* is/are pending in the application.
  4a) Of the above claim(s) *13-23* is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-9,12,24-31 and 34* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on *14 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.
  Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
  Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  a)☐ All b)☐ Some * c)☐ None of:
    1.☐ Certified copies of the priority documents have been received.
    2.☐ Certified copies of the priority documents have been received in Application No. _____.
    3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
  * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
  Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
  Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's affirmation of election of claims 1-12 and 24-34 in the reply filed on March 4, 2005 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-9 and 24-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita et al (U.S. 5,831,374) in view of Tzeng et al (U.S. 6,245,400).

Regarding claims 1 and 24, Morita et al discloses a method of forming plasma display or a plurality of plasma displays. The method includes fixing a high-orientated graphite film, i.e. heat spreader onto the curved surface of the back of the panel unit by gluing. (Col 9, lines 9-28) Morita et al is silent as to the graphite sheet is formed of particles of exfoliated graphite with a layer of adhesive and release material. However, providing a graphite sheet formed of particles of exfoliated graphite with a layer of adhesive and release material as a heat spreader or thermal joint is well known and conventional as shown for example by Tzeng et al. Tzeng et al discloses a flexible graphite sheet article with low thermal resistance, i.e. a heat spreader, an interface sheet to thermally connect a computer chip to a cooling module. (Col 1, lines 44-47) The heat spreader includes a flexible graphite sheet formed by using exfoliated graphite particles or worms and compressing to form the sheet (Col 4, lines 40-45), pressure sensitive adhesive layer, and a release liner, which is easily removed during use of the heat spreader. (Col 6, lines 19-29)

It would have been obvious to one of ordinary skill in the art the at the time the invention was made to provide a exfoliated graphite sheet with pressure sensitive adhesive layer, and a release liner as a heat spreader as disclosed by Tzeng et al in the method of Morita et al to provide a release lined pressure sensitive adhesive flexible graphite sheet with low thermal resistance with the release liner being easily removed without delamination of the flexible graphite sheet. (Col 2, lines 3-9)

Regarding claims 2 and 25, Morita et al is silent as to release material and adhesive are selected to permit a predetermined rate of release without causing damage to the heat spreader material. However, selecting a release material and adhesive to permit a predetermined rate of release without causing damage to the heat spreader material is well known and conventional as shown for example by Tzeng et al. Tzeng et al is considered to disclose selecting pressure sensitive adhesive and release liner to allow the release liner to be removed at a predetermined rate of release without causing damage to the heat spreader material. (Col 5, line 53 to Col 6, line 8)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide release material and adhesive with a predetermined rate of release without causing damage to the heat spreader material as disclosed by Tzeng et al in the method of Morita et al to provide a release lined pressure sensitive adhesive flexible graphite sheet with low thermal resistance with the release liner being easily removed without delamination of the flexible graphite sheet. (Col 2, lines 3-9)

Regarding claims 3-6 and 26-28, Morita et al as modified above is silent as to release material has a load of no greater than 40 grams per centimeter at a release speed of one meter per second or no greater than about 10 grams per centimeter at a release speed of one meter per second and a minimum lap shear adhesive strength of at least about 125 grams per square centimeter or an average lap shear adhesion strength of at least about 700 grams per square centimeter. However, one of ordinary skill in the art would appreciate optimizing the load and lap shear adhesive strength of the release material though routine experimentation and is not inventive to discover the optimum or workable ranges. See In re Aller, 220 F.2d 454, 456, 105 ISPQ 233, 235 (CCPA 1955).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to experimentally determine the working ranges for load and lap shear adhesive strength in the method of Morita et al as modified by Tzeng et al to improve upon what is already known to provide a set of optimum ranges.

Regarding claims 7-9 and 29-31, Morita et al is silent as to the adhesive layer of less than 0.5 mils or less than 0.25 mils, which results in an increase in through thickness thermal resistance of the adhesive/heat spreader material not more than 35% as compared to the heat spreader material. However, providing adhesive layer with through thickness not more than 35% as compared to the heat spreader material is well known and conventional as shown for example by Tzeng et al. Tzeng et al discloses the thickness of the graphite sheet is between 0.1 mil to 500 mil and the adhesive layer has a thickness of 0.1 mil to 3 mil, which provided an increase thickness ranges from 300% to 0.02% as compared to the heat spreader material.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide any adhesive thickness as needed as compared to the heat spreader thickness such as not more than 35% as disclosed by Tzeng et al in the method of Morita et al to provide a release lined pressure sensitive adhesive flexible graphite sheet with low thermal resistance with the release liner being easily removed without delamination of the flexible graphite sheet. (Col 2, lines 3-9)

4. Claims 12 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita et al (U.S. 5,831,374) in view of Tzeng et al (U.S. 6,245,400) as applied to claims 11 and 33 above, and further in view of Brookes (U.S. 3,981,427).

Morita et al as modified by Tzeng et al is silent as to the heat spreader comprises a plurality of sheets of compressed particles of exfoliated graphite. However, forming heat spreader with a plurality of sheets of compressed particles of exfoliated graphite is well known and conventional as shown for example by Brookes. Brookes discloses a method of forming a graphite sheet laminate. The laminate includes a metal substrate and two graphite sheets bonded to the surface of the metal sheet or includes multiple layers of alternating sheets of coated substrate and graphite sheets. (Col 4, lines 45-54 and Col 6, lines 45-52)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to bond graphite sheets to a metal sheet to form a multi-layered laminate as disclosed by Brookes in the method of Morita et al as modified by Tzeng et al to provide a laminate construction with good conduction of heat where rapid transfer of heat is desired. (Col 4, lines 51-54)

Response to Arguments

5. Applicant's arguments filed March 4, 2005 have been fully considered but they are not persuasive.

6. In response to applicant's argument that Morita et al recites the high-orientation graphite sheets are formed by vapor phase deposition and graphitizing a polymer compound, which are considered synthetic in origin and does not include graphite sheets, which are natural in origin such as the compressed particles of expanded natural graphite. After further review of Morita et al by the examiner, the examiner concluded Morita et al recites the method as requiring a high-orientation graphite sheet and considered the method to include any graphite sheets with high orientation of the graphite crystalline structure in the sheet. Exfoliated graphite has an oriented graphite crystalline structure. For example, Caines (U.S. 4,355,684) discloses a heat exchanger with compressed vermicular expanded graphite, i.e. exfoliated graphite, with graphite crystals oriented along an axis normal to the axis of compression. (Col 3, lines 4-14) Therefore, Morita et al is considered to include all thermal conductive graphite sheets of both synthetic and natural in origin. The recitation in Morita et al of the of graphite sheet or film formed by vapor phase deposition and graphitizing a polymer compound are

considered as examples of graphite sheets or films available for the heat spreader and does not limited the reference to graphite sheets that are synthetic in origin.

7. In response to applicant's argument of the limitations of claims 3-9 and 26-31 are not meet by optimization of the ranges. The examiner relied on Tseng et al to provide the general teaching of using an exfoliated graphite sheet as a heat spreader or as a thermal joint and it would be a normal desire of scientists or artisans to improve upon what is already generally known, which provide the motivation to determine an optimum range. In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969) Therefore, these parameters and ranges limitation is not recognized as a result effective variable and are not considered inventive.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Caines (U.S. 4,355,684) is cited to provide the teaching of exfoliated graphite sheet has oriented crystalline structure.

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sing P. Chan whose telephone number is 571-272-1225. The examiner can normally be reached on Monday-Friday 7:30AM-11:00AM and 12:00PM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher A. Fiorilla can be reached on 571-272-1187. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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